

عنوان مقاله:

LDPE and poly(1-butene) blends: Morphology, crystallinity and rheological properties

محل انتشار:

دوفصلنامه پلی اولفین ها، دوره 8، شماره 1 (سال: 1400)

تعداد صفحات اصل مقاله: 10

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خلاصه مقاله:

In this work, the compatibility and crystallinity of low density polyethylene (LDPE) and polybutene-1 (PB-1) blends were studied. Various blends of LDPE/PB-1 containing 5, 10 and 20 wt.% PB-1 were prepared in a corotating twin-screw extruder and characterized by scanning electron microscopy (SEM), shear oscillation rheology and wide-angle X-ray diffractometry (WAXD). A matrix-droplet morphology was observed in SEM images, indicating incompatibility of the two polymers in the solid state. Compared to neat LDPE, the relaxation spectra of the blends were broadened, and a slight increase in their relaxation times was observed. The relaxation time of the blends was enhanced by increasing PB-1 content, which was further proved by fitting rheological data in the Carreau-Yasuda model. Deviation of Cole-Cole diagrams from circular shape means that the blend samples were not miscible and the positive-deviation behavior of the complex viscosity and storage modulus from the mixing rule revealed the formation of strong interfacial interactions. The crystallinity of both LLDPE and PB-1 was decreased as a result of blending. The peaks attributed to the form II of PB-1 crystals were eliminated and the peaks related to LDPE were obviously weakened, suggesting to prevent crystallinity of polymers which is associated with a reduction in the total crystallinity percentage for the blend. The reduction of crystallinity was more pronounced in PB-1 phase

کلمات کلیدی:

blending, morphology, LDPE, Crystallinity, PB-1

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